IDAHO
DEPARTMENT OF FISH AND GAME

Jerry M. Conley, Director

HAGERMAN FISH DISEASE LABORATORY

Annual Report

1 October 1983 - 30 September 1984

by
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ABSTRACT

During the period of this report (October 1, 1983 to September 30, 1984), I visited most state hatcheries at least once to observe fish condition, health and general hatchery practices. In addition, I responded to approximately 123 requests for diagnostic services to determine causes of excessive fish mortalities. Various diseases were diagnosed and appropriate treatments recommended. Also, trips were made to several hatcheries for tissue and ovarian fluid sampling to determine the status of viral diseases in the hatcheries system managed by the Idaho Department of Fish and Game.

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OBJECTIVES

1. To monitor diseases and general health of fish at the 19 major fish cultural installations and several other minor or satellite facilities operated by the Idaho Department of Fish and Game and prescribe treatment, if necessary.

2. To diagnose diseases at hatcheries and to prescribe prophylactic disease control measures or medicines to effect cures.

3. To assist hatchery personnel in any way available to achieve the best finished fish product possible.

RECOMMENDATIONS

The Department should continue to insure that all hatcheries receive publications that are applicable to fish culture, such as "The Progressive Fish Culturist" and are well informed on fish health topics, disease control and management techniques.

The Department should continue to sponsor meetings and orientations for all hatchery personnel as they relate to fish culture to keep workers aware of new innovations and techniques in this field.

Efforts have recently been made to determine optimum loadings at each hatchery and attempts should be made to not jeopardize fish health by exceeding these densities.

Efforts are being made to determine if there is a correlation between the outbreaks of certain diseases at each hatchery with seasons of the year. This could lead to a preventative approach rather than a "after the outbreak" reaction to fish disease outbreaks.

INTRODUCTION

The Idaho Department of Fish and Game operates 19 major fish hatcheries, rearing ponds and redistribution facilities which annually produce about 1 to 1.5 million pounds of fish (Fig. 1).

The project leader usually visits each hatchery at least once per year to routinely examine the fish for disease and general health. He is also available on an as-needed basis. If a disease is encountered, it is diagnosed and treatments are prescribed. Hatchery management practices are also evaluated as they relate to fish health.

The project leader is on call for emergency calls at any hatchery that develops a disease problem during the year.

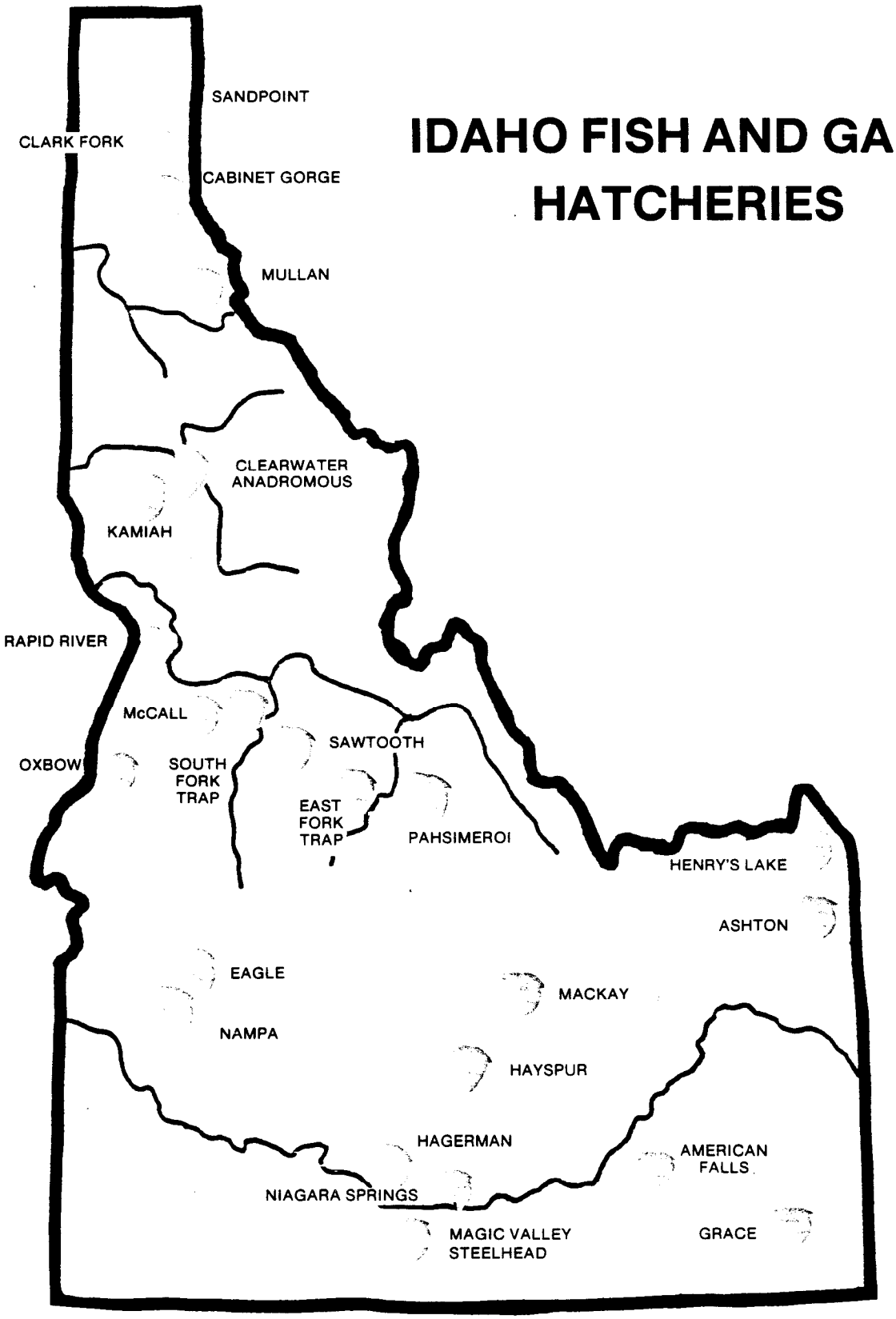

Figure 1. Locations of Idaho fish hatcheries.

The Department purchases a portion of their fish and fish eggs from other states or commercial sources. The project leader may inspect these eggs and fish for disease prior to acceptance by the Department.

Fish feed samples may be taken and analyzed for nutrient values and quality control.

Water supplies are frequently analyzed for chemical characteristics.

TECHNIQUES USED

The Department maintains a small laboratory located at Hagerman Hatchery. This laboratory is equipped to provide facilities and support services where most fish pathogen diagnostic work can be accomplished. Major capabilities include bacteriology, parasitology, histology, fluorescent antibody technique (FAT), some hemotological work, bioassays and some water analysis.

FINDINGS

There were about 123 requests for diagnostic services to determine causes of excessive fish mortalities at state hatcheries from October 1, 1983 to September 30, 1984. There were 6 additional examinations made for fish on nonstate hatcheries or other water supplies. All of these calls were for major problems and did not include minor examinations or managerial and environmental problems. There were also a number of visits for sampling of tissues and ovarian fluids for virology testing, and these are included in this total. Many of the problems required more than one visit, and in some cases, diseases recurred at a later date.

A summary of findings follows in Tables 1 and 2 and Figure 2.

IMMUNIZATIONS

The Department has continued with the program to vaccinate rainbow trout at stations with a history of enteric red-mouth disease (ERM). Fish are immunized with bid contract bacterin using a shower apparatus when fish are about 30 per pound. All hold-over rainbows at Eagle, Hagerman and Nampa are immunized, and to date, no outbreaks of ERM have occurred.

Although vibrio vaccinations are not currently being done on anadromous fish, recent information suggests there may be benefits in returning adults in greater numbers than non-immunized fish. Data is incomplete at this time, but may warrant further investigations.

Table 1. Major pathogens isolated at Idaho Fish and Game hatcheries, October 1, 1983 to September 30, 1984.

Hatchery	No. of visits	No. of exams	Virus	Systemic bacteria	Gill bacteria	Gill parasites	External parasites	Internal parasites	Other
American Falls	2	2							Excess mucus gills - D.O. and gas super-saturation check.
Ashton	2	5		2	1		1	Hexamita-1	Gas saturation check - sunburn.
Clark Fork	0	10	IPN-3	BKD-1	2	2			Kokanee certification - water quality.
Eagle	2	2			1				High gas saturation-brown trout.
Grace	2	7		ERN-I	2				Coldwater disease-I; nutritional-1; brain swelling and inflammation-1.
Hagerman	many	35	IPN-2	5					
			IHN-3	BKD-1	8	12	3	POD-5 Hexamita-1	Coagulated yolk-1.
Hayspur	1	2	IPN-1	1					
Hayden Creek	0	2		BKD-1					Koocanusa R8 adults - no pathogens.
Henrys Lake	2	1							Cutthroat spawner viral check.
Mackay	1	4		2	1				Penducle disease- 1; high gas saturation- brown trout.
Magic Valley	1	1							D.O. and gas saturation check springs.
McCall	4	12		BIM-7		2		1	Spring thing-I; swim bladder fungus-1; nutritional or dropout-I.
Mullen (Hale)	1	6		BKD-3 2	1	3		Hexamita-2	Water quality (pH 6.0)-1.
Nampa	2	10	8	4	2	3			
Niagara Springs*	6	B	IPN-1		3	1			Possible Sulfa toxicity-1.
Oxbow*	1	0							
Pahsimeroi*	1	7	IPN-2	BKD-3	2	3			
Rapid River*	3	6		BKO-3	2			Hexamita-I	
Red River	0	1							Virus check chinook spawners.
Sandpoint	0	3	IPN-1	BKD-1;1	1				
Sawtooth	1	1		BKD					

*Idaho Power Company owned.

Table 2. Exams and findings for non-Fish and Game facilities, October 1, 1983 to September 30, 1984.

Location or facility	Number of visits	Number of exams	Results
Henrys Lake	1	2	Checked adult cutthroat spawners at 2 locations. Probable cause of mortalities-a combination of postspawning stress, high water temperatures (70 F) and bacteria (Aeromonae/Pseudomonas group) found in kidney end spleen cultures.
Hagerman National Hatchery	2	3	1. Bacterial gill disease; 2. Unknown-possible disruption of slime Layer due to handling; 3. Examination of mortalities from pumping tests to determine stress of different pumps.
Rangens Research Hatchery	1	1	Health check on fish purchased by Idaho Power Company for releas in American Falls Reservoir. No pathogens found.

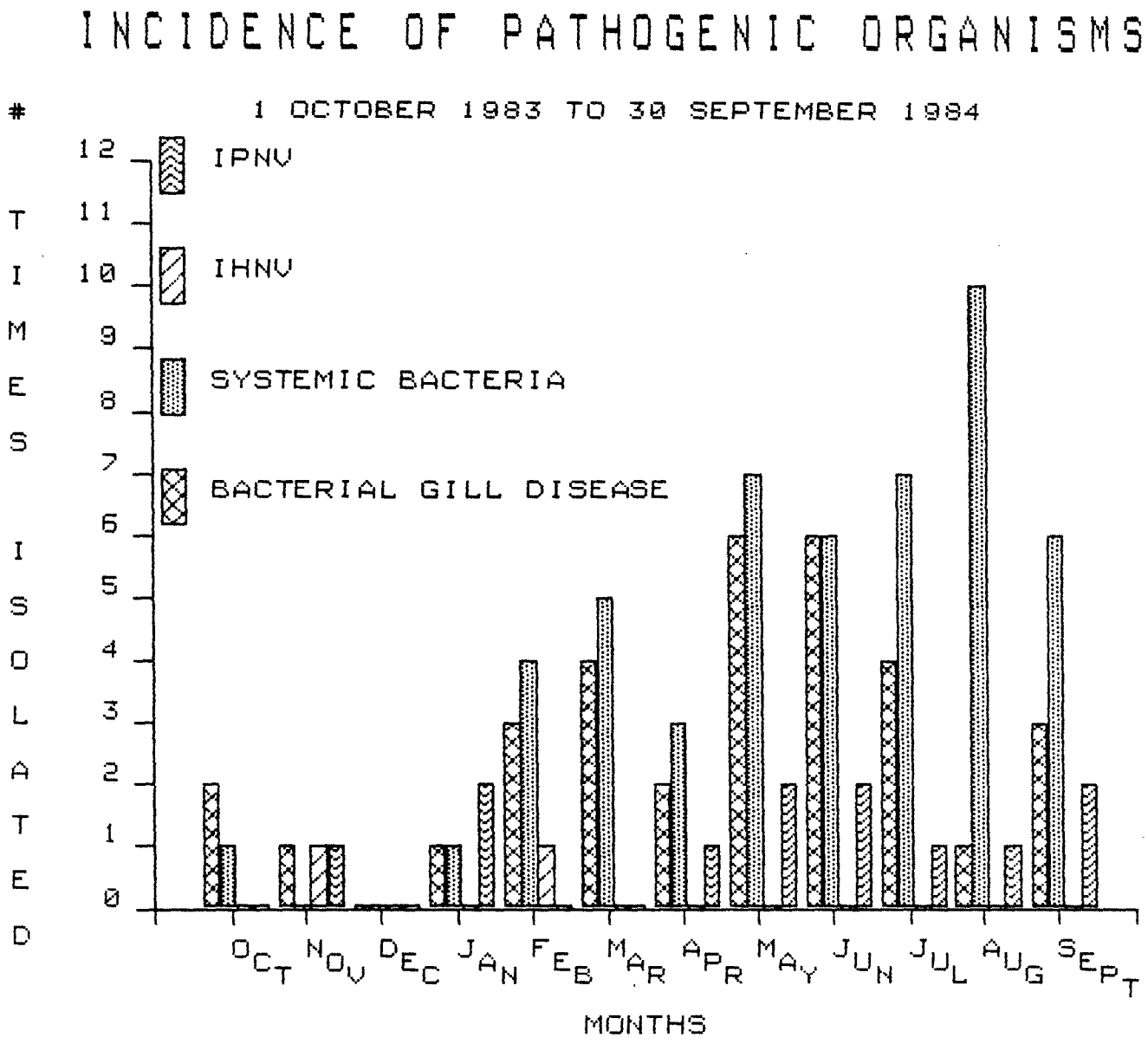

Figure 2. Isolation incidence of pathogenic organisms, October 1, 1983 to September 30, 1984.

HAGERMAN FISH DISEASE LABORATORY

Job II

Annual Report

ABSTRACT

In compliance with the provisions of the Federal Water Pollution Control Act, fish hatcheries are authorized to discharge, under the National Pollutant Discharge Elimination System (NPDES), a restricted amount of solids to all receiving waters of the United States. Monitoring of settleable and suspended solids and other parameters is required. Removal of settleable solids is needed to achieve final limits of the permit. Reports of findings and data storage are also required by federal laws. During the period October 1, 1983 to September 30, 1984, we monitored effluent discharges at the 13 state fish hatcheries that fall under these criteria.

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OBJECTIVES

1. To monitor the effluent from 13 state fish hatcheries to ensure that their effluent meets limitations imposed by the Enviornmental Protection Agency (EPA) through the National Pollutant Discharge Elimination System (NPDES) permit.

RECOMMENDATIONS

Continue monitoring hatchery effluents.

Complete construction of settling systems where needed.

Continue participation with EPA and others for the development of or modification of current, fair and equitable permits.

TECHNIQUES USED

The Environmental Protection Agency (EPA) requires pollutant discharge permits for fish hatcheries which produce 20,000 pounds of fish or more during the year.

The Idaho Department of Fish and Game currently operates 13 fish hatcheries which require permits: American Falls, Ashton, Clark Fork, Eagle, Grace, Hagerman, Hayspur, Mackay, Magic Valley, McCall, Nampa, Niagara Springs*, Pahsimeroi* and Rapid River*.

Parameters required by permits include settleable solids, suspended solids and water flows. Frequencies of samples and sample types vary from station to station, but generally are taken on a bi-weekly basis. Samples are taken on incoming waters, outflows (effluent) and during cleaning and noncleaning situations.

Filters for suspended solids testing were analyzed by a commercial laboratory until August 1984. Beginning in August, the filters were and currently are analyzed at this laboratory. Results are recorded and filed.

Monthly reports from each hatchery are recorded and Discharge Monitoring Reports (DMR) are submitted to EPA monthly. If violations occur, additional written communication is filed with EPA stating the nature of this violation, causes and steps taken to prevent a reoccurence.

Techniques are based primarily on established procedures set forth in "Standard Methods for Examination of Water and Wastewater" and in EPA methodologies.

*Idaho Power Company owned.

In accordance with NPDES permits, water samples are checked for concentrations of settleable solids and suspended solids. Settleable solids are measured in an Imhoff cone and readings are taken on material settled out after one hour. Suspended solids are determined by filtering the sample through preweighed filters which are then oven-dried and reweighed to obtain the net gain.

FINDINGS

We found that all readings for settleable and suspended solids fell within the limits of the permits during normal hatchery operations. However, during cleaning operations, settleable solids may exceed the limitations if no settling facility is present. If limits were to be significantly reduced in a new permit, it could be difficult to meet those limits.

Compilation of settleable and suspended solid concentrations is presented in Tables 3 and 4, as well as in Figures 3 and 4. Water flows in cubic feet per second (cfs) are presented for each hatchery in Table 5.

DISCUSSION

Permits to discharge expired for all state hatcheries on December 31, 1979. Since that time, state hatcheries have continued to sample their effluents and reports to EPA have continued as if we had valid permits.

In late November, 1982, EPA informed fish producers that we would be conforming to new temporary permits until new permanent permits could be issued with the parameters EPA thought pertinent. Parameters changed drastically.

Since that time there have been numerous meetings with various parties concerned about hatchery discharges. These include representatives from commercial, federal and state hatcheries as well as EPA, Idaho Health and Welfare, environmentalist groups and politicians.

The temporary permits were modified following the completion of an industry study and during the process of an EPA-funded study. A further study involving one specific environmentally-impacted stream in the Hagerman area (Billingsly Creek) was done. In June 1984, EPA held public hearings for additional input, both oral and written, to be submitted by all those interested. New permits were to be issued following the review of all data generated by the studies and meetings.

New permits were issued and became effective on October 29, 1984. These permits are currently being contested legally by the commerical fish industry.

Table 3. Maximum settleable solid concentrations obtained at monitored Idaho State fish hatcheries, October 1, 1983 to September 30, 1984. Values are in ml/L.

Location	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
American Falls	--*	--*	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ashton	--*	--*	--*	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Clark Fork	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Eagle	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Grace	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hagerman	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hayspur	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mackay	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magic Valley	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--*	--*	--*	--*	--*
McCall	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nampa	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Niagara Springs**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Rapid River**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

*Facility out of operation for construction purposes.
**Idaho Power Company owned.

Table 4. Maximum settleable solids and suspended solids from effluent of waste treatment system at Niagara Springs*, October 1, 1983 to September 30, 1984.

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
Settleable solids ml/L	<0.1	<0.1	0.2	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
% settleable solids removed	>96.8	>99	>96.6	>98	>97	>89**	>95	unable to calculate 0 to 99	>98.7	>99	>85.7**	>94
Suspended solids - grab mg/L	2.9	15.9	21.9	7.6	18.0	6.8	3.2	2.0	13.7	8.0	2.1	3.B
Suspended solids composite mg/L	3.3	7.8	3.2	3.5	6.1	3.6	3.1	1.8	4.6	5.9	3.6	1.7
% suspended solids removed	93.5	96.9	98.4	96.8	82.3**	81.7**	88	47**	98.6	97.6	97.8	93.3

*Idaho Power Company owned.

kEqual to or greater than.

<Less than.

**Not in compliance with permit:
Permit limitations – settleable solids – 1.0 m VL
suspended solids – 100 mg/L
% removal settleable solids – 90%
% removal suspended solids – 85% (based on composites)

Table 5. Maximum water flows [cfs) at state hatcheries, October 1, 1983 to September 30, 1984.

Station	Flow (cfs) OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
American Falls	--	--	19.1	19.5	19.5	19.5	19.5	19.5	23.8	24.0	21.4	18.7	Closed Oct/Nov
Ashton	--	--	--	4.0	5.5	5.6	7.0	7.0	7.0	7.0	6.0	6.3	Closed Oct/Nov/Dec
Clark Fork	.8.48	8.48	8.88	8.8	11.0	14.64	15.2	14.1	15.2	13.5	12.9	8.9	
Eagle	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
Grace	21.3	19.0	19.0	17.0	14.0	11.5	15.5	19.1	18.9	18.9	23.5	23.0	
Hagerman	72.1	78.5	78.0	96.3	98.9	105.7	108.9	91.2	91.25	88.7	88.1	82.1	
Hayspur	30.91	26.75	23.14	22.47	23.78	21.49	23.41	25.51	27.93	28.6	28.96	25.87	
Mackay	23.0	35.0	29.9	30.0	30.0	30.0	28.0	27.0	29.0	--	--	3.1	Reconstruction Jun/Jul
Magic Valley	9.0	16.2	16.7	17.2	17.2	19.35	19.35	Closed for reconstruction					
McCall	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	
Nampa	44.0	44.0	44.0	44.0	44.0	31.3	31.3	31.3	31.3	32.0	32.0	32.0	
Niagara Springs*	78.9	78.9	78.9	80.46	76.3	76.3	54.16	9.7	18.26	18.1	25.53	35.13	
Niagara Springs* treatment system	4.6	3.1	4.6	4.6	4.6	4.6	0.5	1.0	0.9	0.9	1.08	1.08	
Rapid River*	26.0	25.0	24.0	24.6	24.8	24.3	24.3[a]	12.0	22.0	25.3	22.1	24.5	'flow reduced to 12 cfs by mid-month

*Idaho Power Company owned.

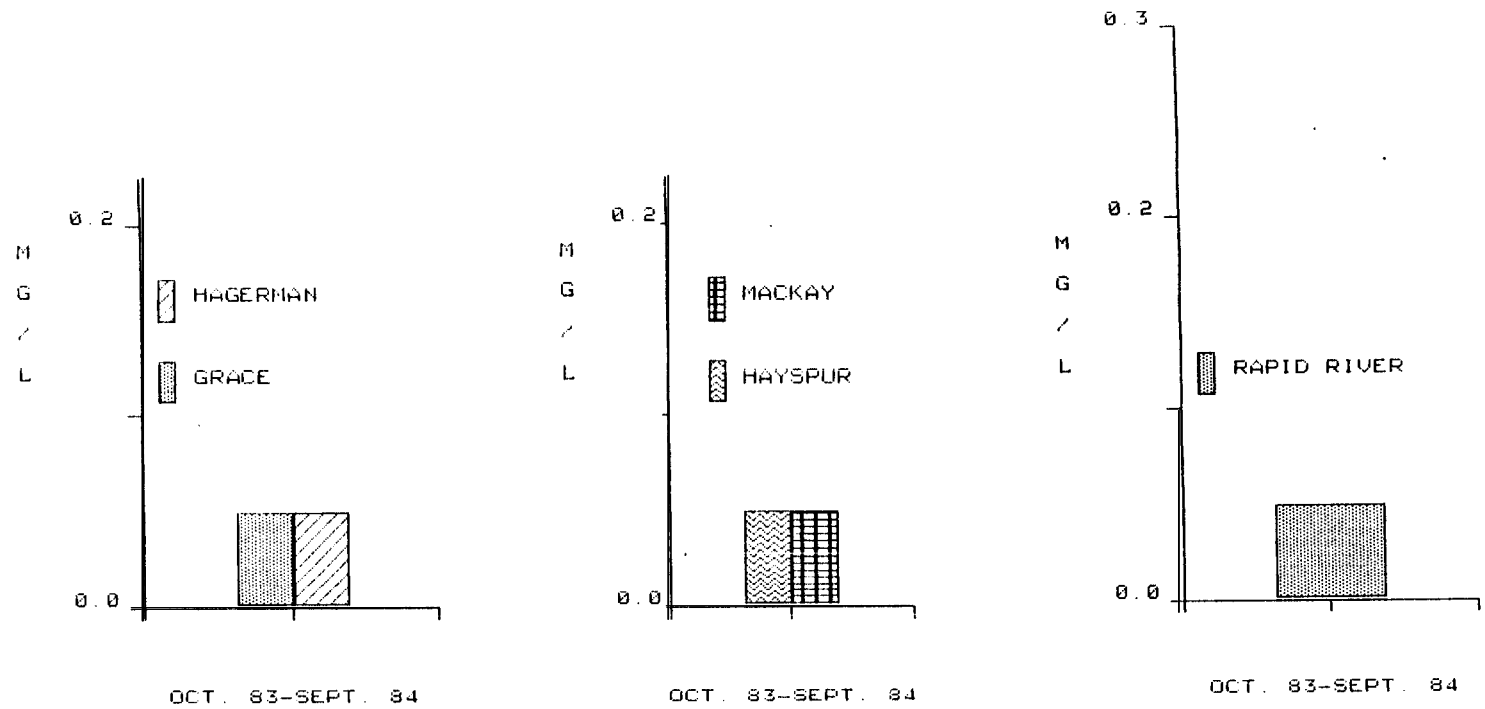

Figure 3. Maximum concentrations obtained for settleable solids, October 1, 1983 to September 30, 1984. Values are in milliliters per liter (ml/l). See Figure 2 for data on waste treatment system used at Niagara Springs.

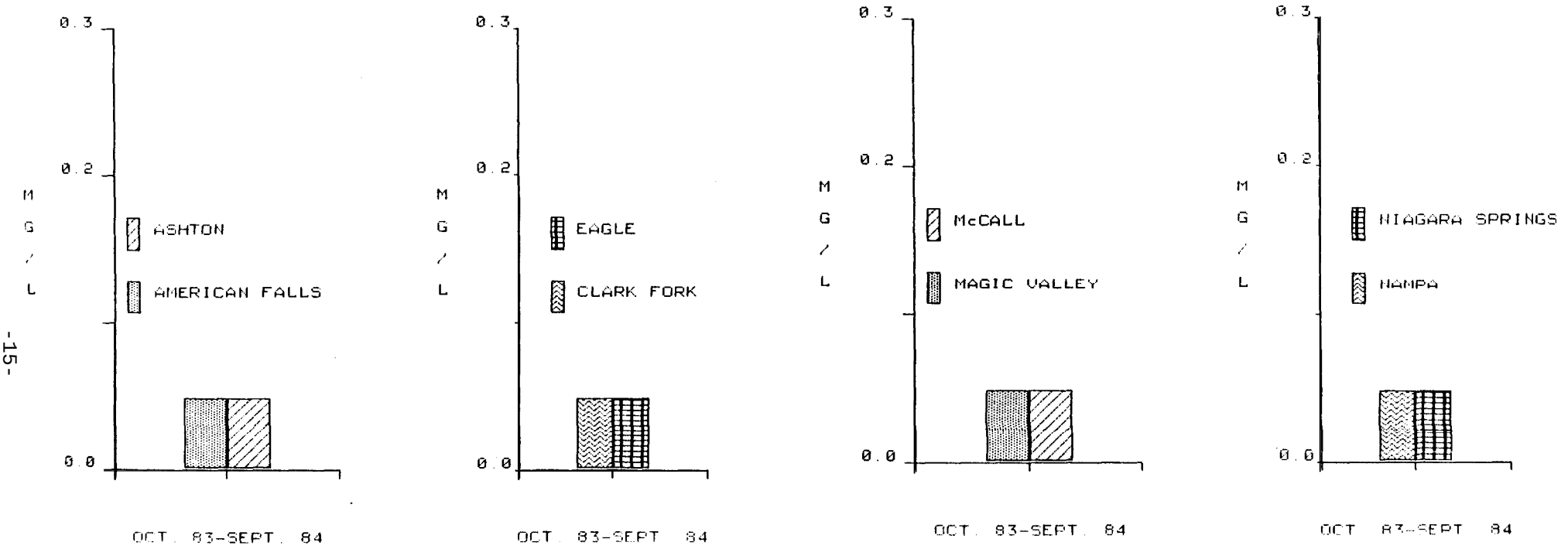

Figure 3. Continued.

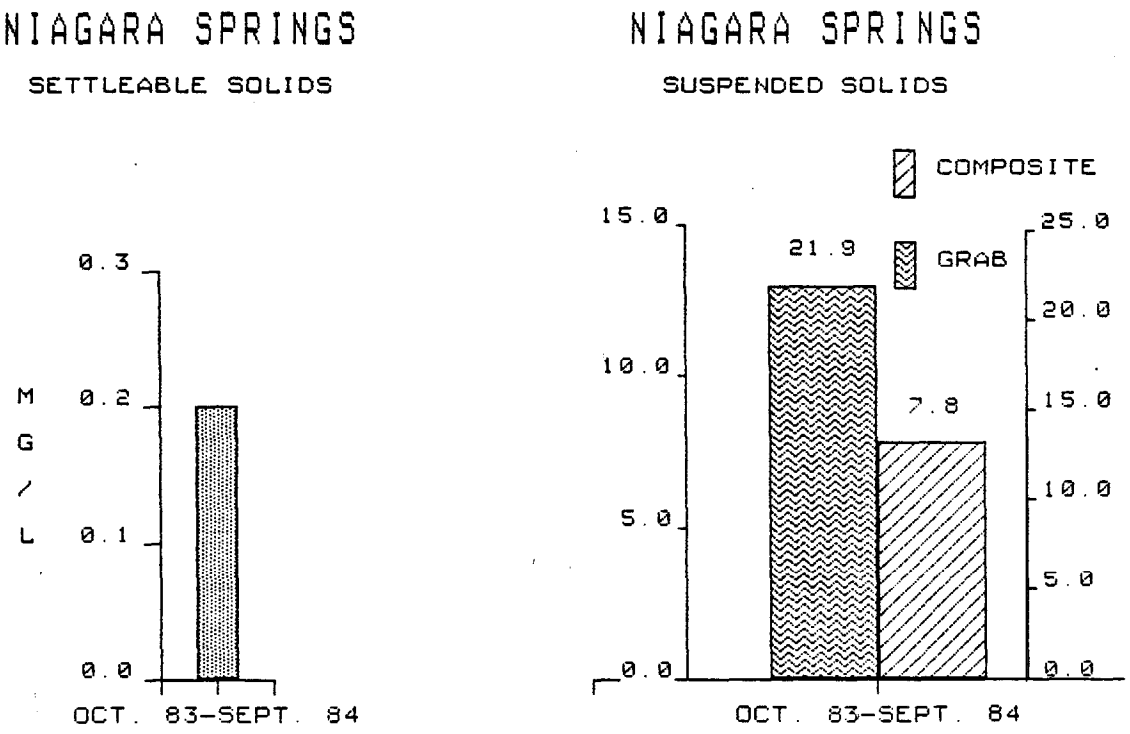

Figure 4. Maximum concentrations obtained for settleable solids (ml/l) and for total suspended solids (mg/l) at the Niagara Springs waste treatment system effluent -- 1 October 1983 to 30 September 1984.